

MATH 152

Mrs. Bonny Tighe

FINAL EXAM

200 points

NAME _____

Section _____ Fri 12/16/05

22 problems with 10 points each

1. Find dy/dx . a) $3e^y + \ln xy = \sin^{-1} x$

b) $y = e^{\sin^{-1} x}$

2. Evaluate: a) $\int \frac{\sec^2 \alpha}{2 + \tan \alpha} d\alpha =$ _____

b) $\int \frac{e^{-x}}{1 - 2e^{-x}} dx =$ _____

3. Evaluate: $\int_1^4 \ln t^4 (\sqrt{t}) dt =$ _____

4. Find the following limits. a) $\lim_{x \rightarrow \infty} \left(\frac{e^{2x}}{x^3} \right) =$ _____

b) $\lim_{x \rightarrow 0^+} (\cos x)^{1/x^2} =$ _____

c) $\lim_{x \rightarrow 0^+} \sin x \ln x =$ _____

5. Evaluate: $\int x^3 \sqrt{9x^2 - 1} \, dx$

6. Evaluate the integral using partial fractions: $\int \frac{x+3}{x^2 - 2x - 3} \, dx = \underline{\hspace{2cm}}$

7. Evaluate $\int \sin^5 x \cos^3 x \, dx =$ _____

8. Find the Macluarin series for the given function and find the radius and interval of convergence. $f(x) = \frac{1}{x-1}$

9. Use substitution to evaluate: $\int \frac{dx}{e^x - e^{-x}}$

10. Determine whether each integral is divergent or convergent and evaluate those that are convergent using improper integrals.

a) $\int_0^{\infty} \frac{2}{(x+1)^2} dx$

b) $\int_0^3 \frac{1}{x^2 \sqrt{x}} dx$

11. Find the length of the curve. $x = y^3$, $0 \leq y \leq 2$

12. Determine whether the series are convergent or divergent using the appropriate test, and if they are convergent, find its sum.

a) $\sum_{n=0}^{\infty} \frac{2}{n^2 - 1}$

b) $\sum_{n=0}^{\infty} \frac{(-1)^n 3^{2n}}{(2n)!}$